

Remarks

Claims 5 to 7 and 11 are cancelled. Claim 12 is amended and claim 14 is added. Accordingly, claims 1 to 4, 8, 9 and 12 to 14 are pending in this application of which claims 1, 12 and 13 are in independent form.

Claim 12 was rejected under 35 USC 112, second paragraph, for the reasons set forth on page 2, paragraph 3, of the action. Claim 12 is amended herein to define a reference level of brightness so that this claim should now be definite as required by the statute.

Claims 1 to 4 were rejected under 35 USC 103(a) as being unpatentable over Zonneveld in view of Lytle. The following will show that claim 1 patentably distinguishes the invention over this combination of references.

Zonneveld discloses an optical microscope including a display unit (see 33 in FIG. 1) which consists of display tubes 34 and 35. The image which is displayed by display tubes 34 and 35 is passed through coupling mirrors 37 and 38 to a video camera 40. However, Zonneveld does not describe any imaging optics for coupling the image of the display unit into the viewing beam path of the microscope.

On the other hand, Lytle relates to a projection lens assembly which, from left to right, while referring to FIG. 1, consists of a planar convex lens 16, a planar convex lens 13, a concave-concave lens 14 and a convex-concave lens 151.

It should be noted, that although in column 2, lines 30

to 35 of Lytle, lens element 14 is recited as being planar-convex, Lytle only discloses a lens element 14 having a slightly concave first surface 26 and a second surface 27 which is deeply concave. However, this slightly concave first surface 26 of lens element 14 is crucial for the Lytle projection lens assembly.

Appendix 1 is attached to this amendment and shows, for different wavelengths, the diffraction pattern in the focal plane (center, border, zone) of the projection objective disclosed in Lytle generated by a bundle of parallel rays coming from infinity and impinging on the projection objective and calculated for the parameters given in the table shown in FIG. 2 of Lytle by Mr. Christian Lücke, the optics designer with Carl Zeiss and coinventor in this present application.

A corresponding diffraction pattern for this projection objective is shown in Appendix 2 where a strictly planar surface 26 of lens element 14 is provided. As compared to the lens assembly disclosed in Lytle, the diameter of the diffraction pattern in the focal plane is approximately 10 time greater.

For comparison, the corresponding diffraction pattern for the image projection module of the present invention, which includes both a plano-convex and a plano-concave lens, is shown in Appendix 3. It can be seen that the dimensions of the diffraction pattern in the focal plane of the image projection module are inferior to 12 μm , that is, inferior to the pixel dimensions of the display unit the image of which is projected by the image projection module.

To summarize, optical calculations show that the optical

characteristics of the Lytle projection lens assembly do deteriorate drastically, if the surface 26 of lens element 14 is not slightly concave, but plane.

The image projection module in the surgical microscope disclosed in the present application, however, is suited for an image display unit configured as an LCD (please see the applicants' disclosure, page 6, line 8). This is because the optical design of the lens assemblies given in Tables 1 and 2 of the present application provides a diffraction pattern for a bundle of parallel rays which is inferior to the dimensions of an LCD pixel given in FIG. 3 of the present application. Therefore, the present application discloses a microscope system having projection optics which are adapted to an LCD display and which include both a planar convex and a planar concave lens.

In view of the above, applicants submit that claim 1 patentably distinguishes the invention over the combination of Zonneveld and Lytle and should now be allowable. Claims 2 to 4, 8, 9 and 14 are all dependent from claim 1 so that these claims too should now be allowable.

Claim 12 was rejected under 35 USC 103(a) as being unpatentable over Zonneveld in view of Lytle and Ernstoff et al. Also, claim 13 was rejected under 35 USC 103(a) as being unpatentable over Zonneveld in view of Ernstoff et al. Applicants respectfully submit that, for the reasons advanced above with respect to Zonneveld, a person of ordinary skill could not possibly combine Zonneveld with either or both Lytle and Ernstoff et al to arrive at the applicants' invention.

Accordingly, claims 12 and 13 should now also be allowable.

Reconsideration of the application is respectfully
requested.

Respectfully submitted,



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